

Short abstracts of various papers read before the society are given in the *Transactions*.

A MISSION of thirteen youths, belonging to the best families in Cambodia, has arrived in Paris for the purpose of study. They have been placed under the care of M. Pavie, who has constructed a line of telegraphs between Siam and Cambodia. This is the first time since 1864 that Cambodians have come abroad for purposes of education.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii* ♂) from South Africa, presented by Mr. George E. Crisp; a Malbrouck Monkey (*Cercopithecus cynosurus* ♂) from West Africa, presented by Miss Ethel O'Donoghue; a Kinkajou (*Cercoleptes caudivolvulus*) from Demerara, presented by Mr. John Carder; four Common Squirrels (*Sciurus vulgaris*), six Common Dormice (*Muscardinus avellanarius*), British, presented by Mr. Thomas Weddle; a Tennant's Squirrel (*Sciurus tennanti*) from Ceylon, presented by Miss Maude Bovill; two Vulpine Squirrels (*Sciurus vulpinus*) from North America, presented by Capt. E. E. Vaill; a Coypu (*Myopotamus coypus*) from South America, presented by Mrs. Amelia Appleton; a Robben Island Snake (*Coronella phocorum*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; two Sly Silurus (*Silurus glanis*), European, presented by the Marquis of Bath, F.Z.S.; a Red Lory (*Eos rubra*) from Moluccas, an Alexandrine Parakeet (*Palæornis alexandri*) from India, deposited.

#### OUR ASTRONOMICAL COLUMN

PERIODICAL COMETS in 1886.—Of the now somewhat numerous list of comets of short period, two will be due at perihelion in the ensuing year:—(1) The comet Tempel-Swift, or 1869 III. and 1880 IV., which is likely to return under circumstances that will render observations impracticable, so far at least as a judgment can be formed without actual calculation of the perturbations. (2) Winnecke's comet, last observed in 1875, its track in the heavens near the perihelion passage in December 1880 not allowing of the comet being seen at that return; the perturbations may be very sensible during the present revolution: neglecting their effect, the mean motion determined by Prof. Oppolzer, for 1880, would bring the comet to perihelion again about August 24<sup>th</sup>, under which condition its path would be as follows:—

	R.A.	Decl.	Distance from Earth
July 25 <sup>th</sup>	177 <sup>h</sup> 5 <sup>m</sup> ...	+10° 2' ...	1 <sup>h</sup> 17'
Sept. 13 <sup>th</sup>	241 <sup>h</sup> 7 <sup>m</sup> ...	-24° 9' ...	0 <sup>h</sup> 9'
23 <sup>rd</sup>	246 <sup>h</sup> 1 <sup>m</sup> ...	-30° 2' ...	0 <sup>h</sup> 64'
Oct. 3 <sup>rd</sup>	264 <sup>h</sup> 8 <sup>m</sup> ...	-35° 6' ...	0 <sup>h</sup> 64'
23 <sup>rd</sup>	305 <sup>h</sup> 0 <sup>m</sup> ...	-36° 0' ...	0 <sup>h</sup> 77'

The actual orbit of Winnecke's comet approaches very near to that of the planet Jupiter in heliocentric longitude 110°, at which point the comet arrives 720 days or 1<sup>h</sup> 97 years before perihelion passage, the distance between the two orbits is then less than 0<sup>h</sup> 06 of the earth's mean distance from the sun.

It is very possible, however, that the comet which may most interest astronomers in 1886 will be that observed in 1815, and known as Olbers' comet, which, according to the elaborate calculations of Dr. Ginzl, will again arrive at perihelion in December 1886. The most probable date that can be inferred from the observations of 1815, and the computation of planetary perturbations in the interval is December 16, but unfortunately the observations did not suffice to determine the mean motion in 1815 with precision, and consequently Ginzl found for the limits of the period of revolution 72<sup>h</sup> 33 and 75<sup>h</sup> 68 years, hence the comet may reach its perihelion many months earlier or later than the date given by calculation. Extensive sweeping ephemerides have been published, and it may not be too soon to direct attention to a search for the comet at the beginning of the next year, or as soon as the region in which its orbit is projected at the time can be advantageously examined.

A CATALOGUE OF 1000 SOUTHERN STARS.—Vol. iii. of "Publications of the Washburn Observatory" is to contain a

catalogue of 1000 stars between 18° and 30° of south declination, formed by Rev. Father Hagen and Prof. Holden from the observations of Prof. Tacchini at Palermo during the years 1867-69, which were printed in the *Bulletino* of that observatory between April, 1867, and July, 1869, and with which Prof. Holden says he became acquainted through M. Houzeau's Vade-Mecum. The stars observed are from the 6th to the 9th magnitudes, and the magnitudes appear to have been very carefully noted, while it is remarked that the positions are excellent. They are reduced to the year 1850, but the mean epoch of observation of each star is appended. The copy before us is a reprint from the above-named volume. Tacchini's observations were made with the Palermo meridian circle fully described in the *Bulletino*.

#### ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, NOVEMBER 1-7

(For the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on November 1

Sun rises, 6h. 56m.; souths, 11h. 43m. 40<sup>h</sup> 9s.; sets, 16h. 31m.; decl. on meridian, 14° 35' S.; Sidereal Time at Sunset, 19h. 15m.

Moon (two days after Last Quarter) rises, oh. 13m.; souths, 7h. 20m.; sets, 14h. 14m.; decl. on meridian, 9° 37' N.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	°
Mercury ...	7 57 ...	12 22 ...	16 47 ...	18° 25' S.
Venus ...	11 11 ...	14 46 ...	18 21 ...	25 50 S.
Mars ...	23 54* ...	7 13 ...	14 32 ...	14 20 N.
Jupiter ...	2 55 ...	9 9 ...	15 23 ...	2 2 N.
Saturn ...	19 45* ...	3 53 ...	12 1 ...	22 18 N.

\* Indicates that the rising is that of the preceding day.

#### Phenomena of Jupiter's Satellites

Nov.	h. m.	Nov.	h. m.
1 ...	6 48	6 ...	5 18
5 ...	5 1	7 ...	2 39
6 ...	3 0		

The Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

Saturn, Nov. 1.—Outer major axis of outer ring = 44<sup>h</sup> 0; outer minor axis of outer ring = 18<sup>h</sup> 9; southern surface visible.

Nov.	h.	
1 ...	4 ...	Mars in conjunction with and 4° 16' north of the Moon.
3 ...	7 ...	Mercury at greatest distance from the Sun.
3 ...	9 ...	Jupiter in conjunction with and 0° 52' north of the Moon.
7 ...	21 ...	Mercury in conjunction with and 6° 16' south of the Moon.

#### THE SCOTTISH METEOROLOGICAL SOCIETY

AT the annual meeting of this Society the Report of the Council stated that thirty-eight new members had been added to the Society during the year, and the membership now numbered 698. A new station had been established on the island of Fidra, at the mouth of the Firth of Forth, and that observations had been made for the Society at San Gorge, Central Uruguay. A large number of naturalists and others had availed themselves of the facilities for research offered by the Scottish Marine Station during the summer, there being thirteen working at the laboratories at the present time. Communications were now going on between the Council and several influential gentlemen in Glasgow, which it was hoped would result in the establishment of a permanent station for marine research on the Clyde. Mr. H. N. Dickson, of the Marine Station, communicated the results of experiments and observations which, during the past two months, he had been conducting at Granton, with the view of collecting data from which to determine the corrections to be applied to the readings of thermometers exposed in the ordinary Stevenson screen, in use in many places over the world. Having referred to the errors to which the ordinary screen gives rise, consequent on the varying atmospheric motion and radiation, he proceeded to say that his investigation was carried on chiefly by means of improved screens designed by Mr. John Aitken of Darroch, and that the dew points from the dry

and wet bulbs by Glaisher's tables had been compared with those given by a new form of hygrometer designed by Prof. Chrystal of Edinburgh University. As regards Mr. Aitken's screen, in some a fan was introduced in order to secure a proper and uniform circulation of air for the thermometers in all weathers; others were simply sunshades; one consisted of two thermometers, one of which was partially blackened; and another of a thermometer having its bulb inclosed in a tight-fitting silver sheath, highly polished. The construction of Prof. Chrystal's hygrometer was explained and a brief account given of the results either already arrived at or suggested during the investigation, and it was intimated the inquiry was to be resumed at the Ben Nevis Observatory during August and September. At this Observatory, the climate of which offers unique facilities for the prosecution of such inquiries, an instrument of novel construction would be added, which had been designed by Prof. Tait for hygrometric research. Prof. Ewing, of Dundee, then described the arrangements which had been made for commencing the proposed earthquake observations on Ben Nevis this summer. The investigation was to include earthquakes proper; earth movements of so very delicate a kind as to be totally indistinguishable without some form of instrumental assistance, which are conveniently called earth tremors; and there were what might be named changes of the vertical, or those tiltings which the earth's surface seemed to be constantly undergoing. The different seismometers to be employed at the Observatory were then described, and in illustration some of the more striking peculiarities of the earthquakes of Japan were referred to.

#### PROF. KIESSLING'S INVESTIGATIONS INTO THE ORIGIN OF THE LATE SUNSET GLOWS<sup>1</sup>

THE interesting and important experimental demonstrations lately made by Prof. Kiessling of Hamburg to illustrate the artificial formation of all manner of sunset effects are probably well known to meteorologists in general. The September number of *Das Wetter* contains a valuable series of comparisons tending to show that the conditions under which artificial glows were produced have actually existed whenever the remarkable sunset effects have made themselves prominent. The following abstract may prove of interest to those who do not receive the paper itself.

With regard to the "after-glow," or re-illumination, he suggests two explanations as possible:—(a) Simple reflection of the refracted rays essential to the formation of the ordinary sunset-glow (the *first glow*); or (b) direct diffraction by a second homogeneous haze at much greater elevation. He considers, however, that the calculated heights of the latter place it out of the question. To the former there are only two important objections, the chief one being the slight polarisation, so far as the very scanty records indicate. The observations are, however, exceedingly deficient. Still, Prof. Kiessling has to allow that they do not tell in favour of the proposed explanation. The other difficulty is the *position* of the glow. It presupposes a mirror-like surface, parallel to the earth, with the intermediate space unusually transparent, conditions at first sight very improbable at the altitudes under consideration. But Prof. Kiessling's own experiments, detailed at the end of his paper on "Die Dämmerungserscheinungen im Jahre 1883," have shown the possibility. In these he obtained results most remarkably similar to those requiring explanation, and by methods reproducing in a striking manner the conditions considered actually to exist in the atmosphere.

A warm, moist stratum of air being produced in contact with a cold stratum the resulting haze along the contact surface formed the site of diffraction phenomena, approaching those actually observed in ordinary brilliant sunsets according to the fineness of the haze particles, and also reflections reproducing the "after-glow."

The almost constant saturation of the cold upper strata in winter is indicated by observations at high-level stations and the persistent upper haze. Let a warm [cyclonic] current come beneath such a layer, then the fine haze at the surface of contact will have beneath it the peculiarly transparent atmosphere common to such conditions and requisite for the transmission of the result-

ing diffraction (and reflection) phenomena. This should be found to exist in *all* brilliant sunsets, Prof. Kiessling stating the following law:—*An intense purple glow, visible over a considerable area, may occur when, in close proximity beneath a lofty and highly-attenuated haze, there is formed an extensive stratum of air at considerably higher temperature.*

DATE OF SUNSET	DATE OF OBSERVATION (ROMAN FIGURES) AND DIFFERENCE OF TEMPERATURE									
	XXVIII.	XXIX.	XXX.	XXXI.	XXXII.	XXXIII.	XXXIV.	XXXV.	XXXVI.	XXXVII.
January 30, 1883	...	...	...	...	...	...	...	...	...	...
February 11	...	...	...	...	...	...	...	...	...	...
April 27 (at Grächen) and 28	...	...	...	...	...	...	...	...	...	...
May 5 (warmer season)	...	...	...	...	...	...	...	...	...	...
Bnt on Rigi (1790 metres)	...	...	...	...	...	...	...	...	...	...
Säntis (2467 metres)	...	...	...	...	...	...	...	...	...	...
St. Bernard (2400 metres, about)	...	...	...	...	...	...	...	...	...	...
September 20	...	...	...	...	...	...	...	...	...	...
Rigi Culm	...	...	...	...	...	...	...	...	...	...
October 9 (Grächen) and 11	...	...	...	...	...	...	...	...	...	...
November 22 and 23	...	...	...	...	...	...	...	...	...	...
November 29 and 30	...	...	...	...	...	...	...	...	...	...
Rigi { glows generally over Europe.	...	...	...	...	...	...	...	...	...	...
Säntis {	...	...	...	...	...	...	...	...	...	...
Pic du Midi (2859 metres)	...	...	...	...	...	...	...	...	...	...

Although we cannot ever expect direct observations of temperature at the common surface producing the sunset glows, yet, as Prof. Kiessling shows, if we can prove that the warm undercurrent always accompanies sunset glows, the proof is practically complete. Such indications may be expected during the colder seasons in the form of abnormal vertical distribution of tempera-

<sup>1</sup> Ueber die Entstehung des zweiten Purpurlichtes und die Abhängigkeit der Dämmerungsfarben von Druck, Temperatur, und Feuchtigkeit der Luft. *Das Wetter*, vol. ii. No. 9. p. 161.